

## **REMARKS**

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and the reasons that follow.

### **I. Status of the Claims**

Claims 1, 6, 23, 24, 26, 28, and 30 are amended to more clearly state Applicants' invention and to ensure that all terms in the dependent claims find antecedent basis in a parent claim.

Because the foregoing amendments do not introduce new matter, entry thereof by the Examiner is respectfully requested. Claims 17-22 are withdrawn. Upon entry, claims 1-16 and 23-30 will be pending for examination.

### **II. Rejections under 35 U.S.C. §102(e)**

Claims 1-15 and 23-30 stand rejected under 35 U.S.C. 102(e) as allegedly being anticipated by Shahidi, U.S. Patent No. 7,844,320 ("Shahidi"). Office Action at pages 2-3. Applicants respectfully traverse this ground for rejection.

To anticipate a claimed invention, a reference must teach each and every element of the claims. As detailed below, Shahidi fails to meet this requirement.

#### **A. Shahidi does not teach recording and storing "static image data," as required by the claimed invention.**

The Examiner asserts that Shahidi discloses a method for "recording and storing static image data of the organ structure before the intervention." Office Action at page 2, paragraph 2. Applicants respectfully disagree.

Contrary to the Examiner's assertion, Shahidi does not teach a method for recording and storing static image data. Rather, this reference merely "assumed that three-dimensional image data of the patient's [organ] have been previously obtained" before the intervention. Shahidi at column 6, line 42. Shahidi therefore does not teach recording or storing "static image data", as required by the claimed invention.

**B. Shahidi does not teach "successive correction" of the instrument position in relation to the static data or vice versa.**

The Examiner asserts that the position of "the instrument [in Shahidi]...is successively corrected in relation to the static data by a transformation." Office Action at pages 2-3. Applicants respectfully disagree.

Contrary to the Examiner's assertion, Shahidi does not teach "successive correction" of the instrument position in relation to the static image data. Rather, "as the instrument is moved or rotated, the position tracking system [in Shahidi] continually provides data to the computer indicating the location and orientation of the instrument." Shahidi at column 3, line 67 to column 4, line 3. In other words, because in Shahidi the position of the instrument is registered by an optical tracking system (OTS), the dislocation of the instrument within the patient is detected via the OTS. This information is then used to display the 3D imaging data from a desired view point at a desired angle. Accordingly, Shahidi does not employ a successive correction as in the claimed invention, which requires a transformation defined by an optimization method taking into account the geometric description and information on the previous distance covered by the instrument.

In addition to Shahidi's failure to teach "successive correction," Shahidi also fails to teach extracting the tubular organ structure and converting the course thereof into a geometric description. Nor does Shahidi teach using the geometric description to record the instrument position with respect to the tubular organ structure.

**C. Shahidi does not teach “a transformation ... taking into account ... the previously distance covered by the instrument”**

The Examiner asserts that “[t]he information on the distance covered represents the continuously recorded or constantly refreshed spatial position of the instrument” and “[t]he information on the distance covered contains further features which can in particular represent ramifications of the tubular organ structures during advancement of the instrument.” Office Action at page 3 (citing Shahidi at column 7, line 53 – column 8, line 16; and column 8, lines 31-52, respectively). Applicants respectfully disagree.

Contrary to claim 1 of the present invention, Shahidi does not teach taking into account the “distance covered by the instrument” to perform a transformation to obtain “successive correction” of the instrument’s position. Instead, the paragraphs cited by the Examiner only discuss that “[t]he location and orientation of the transducer is tracked and determined by the OTS [i.e., optical tracking system]” and that “the computer ... reads the OTS data and determines whether the surgical instrument has moved.” Shahidi, column 7, line 53; and column 8, line 43, respectively. Shahidi therefore does not teach “a transformation ... taking into account ... the previous distance covered by the instrument.”

**D. In contrast to the claimed invention, Shahidi requires an intra-operative imaging technique.**

In contrast to the claimed invention, Shahidi requires that the “intra-op images [be] fused ... with the pre-op images generated by the pre-op protocol ... and the composite images [be] further displayed.” Shahidi at column 7, line 60. As an example of the intra-operative imaging techniques, the surgical instrument in Shahidi further includes an ultrasound transducer which scans and detects ultrasound imaging data. The location and orientation of the transducer is tracked and determined by the OTS and may be used to reconstruct three-dimensional intra-op image data for the region of interest, which can then be fused with the pre-op images (column 7 line 38-42 and 52- 60). Unlike Shahidi, the claimed invention does not require intra-operative imaging techniques.

**E. Additional difference between Shahidi and the claimed invention**

Shahidi further differs from the claimed invention in the following aspects.

(1) The images of Shahidi are segmented, thereby allowing the viewer to see beyond obscuring surfaces in the anatomic structures (Shahidi at column 13, line 56, to column 14, line 5).

(2) Shahidi uses fiducial markers to enable registration of images generated prior to the intervention (Shahidi at column 5, line 38- 40).

(3) Shahidi requires a sensing means mounted overhead to view the table and light-emitting diodes mounted on the surgical instrument, indicating the orientation and location of the instrument (Shahidi at column 5, lines 50-62). The OTS thus generates the position detecting data on a continuous basis, so that as the surgical instrument is moved, the position and orientation of the surgical instrument are continually tracked. The three-dimensional scan data are then manipulated to position and orient the resulting three-dimensional perspective view and to define cutting planes and reference markers in the displayed image indicating and clarifying this view (column 7 line 19- 23);

Accordingly, as Shahidi does not teach each and every element of the claimed invention, Applicants respectfully request that the rejection against claims 1-15 and 23-30 be withdrawn.

**III. Rejections under 35 U.S.C. § 103(a)**

Claim 16 stands rejected under 35 U.S.C. § 103(a) for allegedly being obvious over Shahidi in view of Green, U.S. Patent No. 5,928,137 (“Green”). Office Action at pages 3-4. Applicants respectfully traverse this ground for rejection.

As discussed above, Shahidi fails to teach a number of elements in the claimed invention. Green does not cure Shahidi’s deficiencies. As a result, Shahidi and Green combined do not teach or suggest each and every element of the claimed invention.

Accordingly, Applicants respectfully request that the rejection against claim 16 be withdrawn.

**CONCLUSION**

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. § 1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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